Vital Statistics Technical Notes

Sources of Data

Vital Statistics data come from Certificates of Live Birth, Certificates of Fetal Death, Certificates of Death, Certificates of Marriage, and Certificates of Dissolution. The forms for these certificates are provided by the Washington State Department of Health. The following table describes who completes the forms and where they are filed:

Filing of Washington State Vital Statistics

Certificate	Completed by	Initially Filed with
Live Birth	Hospital or Birth Attendant	State Dept. of Health
Fetal Death	Hospital or Birth Attendant	Local Health Jurisdiction
Death	Funeral Director, Physician, Coroner or Medical Examiner	Local Health Jurisdiction
Marriage	Person Performing the Marriage	County Auditor
Dissolution	Clerk of Court, Petitioner's Attorney	County Clerk
Abortions	Abortion Providers	State Dept. of Health

RCW 70.58 which governs the registration and reporting of vital statistics requires births, fetal deaths, deaths, marriages, and dissolutions of marriage to be reported within a timely fashion. Birth and death certificates are designed to gather information in a manner consistent with federal reporting requirements of the National Center for Health Statistics. WAC 246-490-100 requires providers to report abortions within one month.

The Center for Health Statistics actually registers only those vital events occurring in Washington State. However, a formal interstate exchange agreement governs the mutual exchange of information on births and deaths between states and other countries so that events occurring to Washington residents elsewhere are also reported to this state. Such an interstate exchange agreement does not exist, however, for marriages and divorces. Therefore, the Center for Health Statistics does not have the records for all of the state's residents since some may have gone elsewhere to be married or divorced.   Interstate agreement between most states and Canada ensures comparative arrangement between Vital Records offices.

Starting in 1992, hospitals or birth attendants use the Electronic Birth Certificate (EBC) system to send birth records directly to the Department of Health instead of to registrars of local health jurisdictions.

Population data used to produce tables on this website are from the Washington State Office of Financial Management, Forecasting Division, *Intercensal and Postcensal Estimates of County Population by Age and Sex: 1980-2001,* August, 2001.

Residence and occurrence

Data may either be tabulated by residence (where the person lived) or by occurrence (where the event occurred). For example, a woman who lived in Olympia (Thurston County) but had her baby in Seattle (King County) would be counted in Thurston County on a residence table and in King County on an occurrence table. Some users may be tempted to add residence and occurrence figures together to get a total for an area, but this is not correct. There is a great deal of overlap between these two, as most residents of a county also have their babies or die in the same county. Other users try to subtract residence and occurrence data to figure out how many residents are born or die outside of their county, but this is also incorrect. The only way to determine where county residents are having babies or dying is to tabulate births or deaths by place of residence relative to place of occurrence. For example, in Natality Table 18 on this website the mother's county of residence is cross-tabulated by the county in which the birth occurred.

City data are generally less reliable than county data. The city of residence is assigned by whether or not the person reportedly lived within city limits using responses to an item on the certificate: "Inside city limits - yes/no." If the response to this item is "yes," "unknown," or blank, the place of residence is assigned to the reported city. If the response is "no," the place of residence is assigned a "balance of county" code. Reporting on this item has been found to be somewhat unreliable when compared to locating addresses within city boundaries using geocoding software. For city of occurrence there is no "inside city limits" item to use for coding. If a city is given on the certificate, the event is coded as occurring within city limits of that city. However, if the place of occurrence lists a rural road, state park, or other remote location, the place of occurrence is coded to "balance of county."

Numbers vs. crude or age-adjusted rates

When should numbers or rates be used? The number of events can be used to determine the size of a problem in any area (e.g., how many people die of cancer) or to estimate population changes due to birth and death. But, using just numbers, we cannot readily compare two areas or two time periods. Such comparisons should take the size of the population into account to avoid erroneous conclusions.

To eliminate the effect of different sized populations, we compare rates. A rate is the number of vital events (such as deaths) in a specified time period divided by the number of people at risk of these events in that period (typically, a state or county population, or the number of births in the case of infant death). This figure is generally multiplied by a constant such as 1,000 or 100,000 to get a number that is easy to read and compare and is reported as "per 1,000" or "per 100,000."

Rates calculated in this manner are called *crude rates*. They adjust for differences in population size but not differences in population characteristics. These population characteristics also need to be considered in interpreting comparisons. For example, since death rates increase with increasing age, a county with an older population may have higher death rates just because its population is older.

To compare rates and see if the county is high just because of its older population, we need to use *age-adjusted death rates*. These rates are computed by taking a county's death rates for each age group and applying them to a standard population. The traditional standard has been the 1940 US population. However, in 1999 the standard changed and is now the 2000 US population. When comparing age-adjusted rates, it is important to compare rates that use the same standard population.

The age-adjusted death rate tells us what the county's death rate would be if it had the same age distribution as the standard population. The major use of age-adjusted death rates is to allow comparisons between different areas and/or over various periods of time. Users should be aware that an age-adjusted death rate has no absolute meaning; it is an artificial number based on a hypothetical population and is only useful for comparing with other rates calculated in the same manner.

Although reports often focus on which population has the highest rate, one should remember that rates can mask differences in numbers that may be needed for policy decisions. For example, the infant mortality rate is considerably higher for many people of color than for whites. However, due to the state's racial composition, most infants who die in this state are white. To reduce racial disparity, one would focus on reducing infant mortality among people of color. Such a reduction, however, would not necessarily have much effect on the state's overall infant mortality rate. In determining the burden of a health problem in a community, numbers are usually the most appropriate measure.

Small numbers

How should small numbers be handled? If the state collects all births and deaths in a year, then aren't the birth and death rates exactly as calculated? It's certainly true that vital statistics are not based on samples of the population, as many research data are. We do know the actual number of births, deaths, and population (assuming complete reporting of events), so we can calculate an exact birth or death rate for any one year. However, the data may still be affected by random fluctuations in the number of events between successive measurements (e.g., for different years).

The effect of such random fluctuations on birth or death rates is proportionately larger when the number of events is small. For example, one more infant death has a larger numerical impact on an area with 3 deaths than it does on an area with 300 deaths. Because of these random fluctuations, the rates based on small numbers may not be as reliable as those based on larger numbers in the sense that they may have limited predictive value. For more help in using small numbers consult the *Guidelines* at http://www.doh.wa.gov/Data/guidelines/SmallNumbers.htm.

Cause of Death

The causes of death presented in this website are classified in accordance with the International Classification of Diseases, Tenth Revision published by the World Health Organization. The State of Washington began using this revision on January 1, 1999. The ninth revision was used for 1980-1998. The change to ICD-10 will create a discontinuity in trends that must be accounted for when comparing 1999 mortality to prior years. To put it another way, *1999 cause-of-death data are not comparable to prior years*, unless adjustments are made for the coding and classification changes. Without adjustment, it is impossible to know whether an observed increase or decrease in deaths due to a particular cause is "real" or merely the result of the changes in classification and coding.

To enable comparisons across the ICD-9 to ICD-10 transition, a preliminary comparability study was carried out by the National Center for Health Statistics (NCHS). NCHS double-coded a large sample of the 1996 national mortality file, once by ICD-9, and again by ICD-10. A **comparability ratio** was then calculated by dividing the number of deaths for a selected cause of death classified by ICD-10 by the number of deaths classified to the most nearly comparable cause of death by ICD-9.   The resulting ratio can be used to *adjust* counts and rates for a given cause of death classified by ICD-9 so they are comparable to those for the most similar cause classified by ICD-10. The ratio will also allow users to estimate the extent of the discontinuity of the change to ICD-10 by showing the net effect of coding and classification changes. The preliminary comparability

study will be followed by a comparability study based on the complete national mortality file in 2002.

Tabulated causes of death in this website are based on the underlying cause of death. The underlying cause of death is defined as "(a) the disease or injury which initiated the train of events leading directly to death or (b) the circumstances of the accident or violence which produced the fatal injury." International (World Health Organization) rules are used to determine the underlying cause of death using data supplied by the certifier in the "cause of death" and "other significant conditions" sections of the death certificate.

Due to the detailed nature of the ICD classification system, it is common to group ICD codes into more general categories for analysis and comparison purposes. The National Center for Health Statistics (NCHS) provides one of the most commonly used classification systems in which causes of deaths for adults are grouped into 113 separate groups and deaths for infants into 130 groups. NCHS groupings were used throughout this website.

Definitions

Birth Weight - Weight of fetus or infant at time of delivery (normally recorded in pounds and ounces).

Fetal Death - Death prior to the complete expulsion or extraction from its mother of a product of human conception, irrespective of the duration of pregnancy. The death is indicated by the fact that after such expulsion or extraction the fetus does not breathe or show any other evidence of life such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles. Reporting of fetal deaths to the state is required only when the gestational period is twenty weeks or more.

Infant Death - Death of a child under one year of age.

Live Birth - The complete expulsion or extraction from its mother of a product of human conception, irrespective of the duration of pregnancy, which, after such expulsion or extraction, breathes, or shows any other evidence of life such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached.

Abortion - The termination (spontaneous or induced) of a pregnancy before the fetus has attained viability. Consistent with common usage and understanding, when the term abortion is used in this report, it refers to induced abortion.

Gestational Period - Number of weeks elapsed between the first day of the last menstrual period and date of delivery or date of pregnancy termination. The term *gestational period* is interchangeable with *weeks of gestation, gestational age*, and *duration of pregnancy*. This report uses the physician's estimate of gestational age.

Induced Abortion - The purposeful interruption of pregnancy, irrespective of the duration of pregnancy, with the intention other than to produce a live born infant or to remove a dead fetus, the result of which is not a live birth. Procedures for false pregnancy, ectopic pregnancy, and missed abortion (dead ovum retained in uterus in intended pregnancy) are not included in the definition. The term is used in this report interchangeably with *induced termination of pregnancy*, *induced termination*, and *abortion*.

Live Birth Order - Total number of live births to a given mother, including current birth.

Maternal Death - Death attributed to complications of pregnancy, childbirth, or the puerperium (ICD-10 O00-O99) for women of childbearing age; includes abortion-related death.

Neonatal Death - Death of an infant within the first 27 days of life.

Nulliparous - Having never given birth to a liveborn infant.

Occurrence Data - Data allocated by place where the event occurred, regardless of the person's place of residence.

Parity - Total number of previous live births; does not include the current birth.

Perinatal Death - Fetal deaths of 20 or more weeks' gestation plus infant deaths of less than seven days. This is one of four definitions used by the National Center for Health Statistics. Caution should be used in comparing perinatal death rates in this website with rates from other sources unless it is certain that the same definition has been used.

Plurality - The number of siblings born as the result of a single pregnancy (e.g., twins, triplets).

Postneonatal Death - Death of an infant of 28-364 days of age.

Pregnancy - The sum of abortions (induced terminations), live births, and fetal deaths (spontaneous terminations) reported to the state. This figure underestimates the actual number of pregnancies because fetal deaths are required to be reported to the state only for gestational ages of 20 weeks or more. Thus, early fetal deaths (commonly called 'miscarriages') are not included in the total.

Premature Birth - A live birth weighing 2,500 grams (5-1/2 pounds) or less. If birth weight is not stated, length of gestation (under 37 weeks) is used.

Residence Data - Data allocated by place of residence of the child's mother (births, fetal deaths), or by place of residence of the decedent (deaths), regardless of where the event occurred.

Underlying Cause of Death - The disease or injury which initiated the train of morbid events leading directly or indirectly to death or the circumstances of the accident or violence which produced the fatal injury.

Rates and Ratios

Rounding of Rates - Rates are rounded to the nearest tenth. When the rate or percent is less than one-tenth, the entry is 0. Rates are not calculated when the number of events is less than 5.

Rates and Ratios Used in this Website - Rates and ratios are calculated by dividing the number of events of concern by the population at risk (or a related population) and multiplying by a standard constant (i.e., 1,000 or 10,000 or 100,000).

$$(Crude)\ Birth\ Rate = \frac{\#\ Live\ Births}{Total\ Population}\ x1,000$$

$$Age - Specific\ Birth\ Rate = \frac{\#\ Births\ for\ Specific\ Age\ Group}{Population\ for\ Same\ Age\ Group}\ x1,000$$

$$(Crude)\ Death\ Rate = \frac{\#\ Deaths}{Total\ Population}\ x1,000$$

$$Age - Specific\ Death\ Rate = \frac{\#\ Deaths\ for\ Specific\ Age\ Group}{Population\ for\ Same\ Age\ Group}\ x100,000$$

$$Cause - Specific\ Death\ Rate = \frac{\#\ Deaths\ for\ Specific\ Cause}{Total\ Population}\ x100,000$$

$$Age - adjusted\ Death\ Rate = \sum_{i} Wi \bullet \frac{\#\ Deaths_i}{Population_i}\ x100,000$$

$$where\ Wi = \frac{Standard\ Population_i}{Total\ Standard\ Population}$$

$$and\ _i = agegroup$$

$$Infant\ Death\ Rate = \frac{\#\ Infant\ Deaths}{Total\ Live\ Births}\ x1,000$$

$$Neonatal\ Death\ Rate = \frac{\#\ Neonatal\ Deaths}{Total\ Live\ Births}\ x1,000\ -+$$

$$Postneonatal\ Death\ Rate = \frac{\#\ Postneonatal\ Deaths}{Total\ Live\ Births}\ x1,000$$

$$Maternal\ Death\ Rate = \frac{\#\ Maternal\ Deaths}{Total\ Live\ Births}\ x10,000$$

$$Fetal\,Death\,Ratio = \frac{\#\,Fetal\,Deaths}{Total\,Live\,Births}\,x\,1{,}000$$

$$Perinatal\,Death\,Rate = \frac{\#\,Perinatal\,Deaths}{Live\,Births + Fetal\,Deaths}\,x\,1{,}000$$

$$General\,Abortion\,Rate = \frac{Total\,Abortions}{Women\,of\,Childbearing\,Age(15-44)}\,x\,1{,}000$$

$$General\,Fertility\,Rate = \frac{Total\,Live\,Births}{Women\,of\,Childbearing\,Age(15-44)}\,x\,1{,}000$$

$$Pregnancy\,Rate = \frac{\#\,(Live\,Births + Abortions + Fetal\,Deaths)}{Women\,of\,Childbearing\,Age(15-44)}\,x\,1{,}000$$

Additional Services

The annual tables provide an overview of the types of data available through the Washington State Center for Health Statistics. Birth, death, and fetal death data are also available as raw data files on the Center's CD-ROM *"Vital Registration System Annual Statistical Files, Washington State."* The CD-ROM contains data in ASCII format, detailed technical documentation, and annual summary tables for 1980-1999 in Excel format. To order a copy of the CD-ROM, call (360) 236-4327.